

Effects of Concept-Based Instruction on an English Language Learner in a Rural School: A Descriptive Case Study

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Abstract

The No Child Left Behind Act of 2001 calls for a radical restructuring of the educational system, forcing low-performing schools and districts to make widespread changes in current assessment policies and instructional practices. Our previous research on low-performing students and students with disabilities indicates that significant gains in learning can be attained by intentionally aligning curriculum and instruction with assessment using an instructional approach called concept-based instruction. The purpose of this paper is to describe the positive impact of concept-based instruction on one English language learner in a rural school district. This research is part of a much larger effort at validating concept-based instruction as an instructional approach.

Introduction

The No Child Left Behind Act of 2001 (NCLB), enacted in 2002, calls for radical restructuring of the educational system and amends the Elementary and Secondary Education Act (1965). NCLB mandates that low-performing schools and districts make widespread changes in current assessment policies and instructional practices. NCLB requires that the academic achievement of all children be measured in reading, writing, and math. Scores from these annual tests impact the entire educational enterprise, from school funding to parental school choice. Most affected by this legislation are districts in rural areas with concentrated populations of culturally and linguistically diverse (CLD) students. These districts must struggle to balance budgetary demands

specific to geographically diverse areas and locate necessary educational resources in a limited environment. Under this legislation, restricted access to personnel and services necessary to support the learning needs of CLD students exacerbates the struggle of rural schools to provide appropriate instructional opportunities (Reyes & Rorrer, 2001).

Under NCLB, high-stakes decisions are based on the results of disaggregated statewide assessment data. The academic progress of individual students is jeopardized if these districts cannot provide effective instructional interventions for CLD students, with consequences including reallocating Title I funds that support supplemental services or transporting students to alternate school facilities. Given the current accountability climate, the highest priority for educators is to change current instructional practices in order to promote high academic achievement for all students. Our previous research on low-performing students and students with disabilities indicates that these students can attain significant gains in learning if schools intentionally align curriculum and instruction with assessment using an instructional approach called concept-based instruction (CBI). (See Nolet & Tindal, 1994; Hollenbeck & Tindal, 1996; McCleery & Tindal, 1999.) The purpose of this article is to describe the positive impact of CBI on one English language learner in a rural school district.

For traditional instruction of content material to be successful, students must enter the learning environment with the necessary prior knowledge and reading and writing skills to access content material. However, deficiencies in basic reading and writing skills in English often prevent CLD learners from understanding the content. These discrepancies between current content knowledge and needed reading and writing skills place students with limited English proficiency, low basic skill competencies, and/or learning disabilities at risk of academic failure. Current trends in dropout rates, low achievement, and referrals for special education services illustrate the magnitude of this issue for CLD students (Gersten & Brengelman, 1994). To remove the barriers for content acquisition and to promote academic success for CLD students, teachers must appropriately modify instruction and reduce the emphasis and reliance on the English reading skills needed to understand the content and the writing skills necessary to express content knowledge required in typical classrooms. The authors acknowledge that it is challenging and time consuming for teachers to adjust delivery methods and techniques to incorporate effective strategies for meeting diverse student needs while including meaningful learning experiences (Gersten & Brengelman, 1994). Teachers need effective research-based instructional approaches that promote content acquisition while developing English-language skills (Gersten & Jiménez, 1998; Reyes & Rorrer, 2001). CBI provides the necessary support to accomplish these instructional goals within the unique constraints of rural school districts, which may face challenges such as limited funding and inadequate expertise in accommodating CLD students.

Concept-Based Instruction

Extensive research has been conducted to examine effective instructional strategies for teaching content material to CLD students (Gersten & Jiménez, 1998). Key features of these strategies include identifying big ideas, scaffolding instruction, providing visual displays of information, linking prior knowledge and experience, and verbally interacting with students throughout the learning process (Gersten & Brengelman, 1994). Additionally, incorporating higher order thinking skills into classroom instructional procedures promotes understanding of content material while reducing cognitive demands for memorizing (Gersten & Jiménez, 1998). The critical components of CBI are consistent with these techniques.

CBI aligns curriculum and instruction with assessment in three distinct phases. First, information is organized into critical knowledge forms (facts, concepts, attributes, and principles) that reflect the depth and breadth of a content domain. Second, instruction on declarative and procedural knowledge is delivered using graphical presentations of information enriched with scaffolding activities and interactive discussions. Third, critical-thinking measures are administered that encourage students to transfer knowledge to new situations and problem-solving events. Complexity of thought is elicited in these assessment tasks and measured within a taxonomy of intellectual operations (reiterate, summarize, illustrate, predict, explain, and evaluate) first introduced by Roid and Haladyna (1982) and adapted by Tindal and Nolet (1994).

Facts are easier to teach, but substantially harder for low-achieving students to learn, because they are communicated in dense language and must be memorized (Tindal & Nolet, 1994). Therefore, to assist in putting isolated facts into context, the curriculum is planned around concepts that share a common set of defining attributes (Tindal, Nolet, & Blake, 1992). Particularly important for CLD students, concepts and attributes are overtly named and defined in appropriate vocabulary that ensures categorization to facilitate recall and understanding (Klausmeier, 1990). Attributes serve as critical structural components of concepts to provide rules for generating, selecting, and sequencing examples and non-examples. Explicitly specified concept attributes are critical in providing students with the “rules” of generalizability. Concept attributes enable students to apply knowledge to new circumstances, settings, places, events, and time periods and across domains. Moreover, concept attributes can be juxtaposed to non-examples to highlight the critical distinctions (stream vs. brook, ocean vs. lake, etc.). The ability to discriminate between examples and non-examples helps students learn concepts (Merrill & Tennyson, 1971) because students can organize information into a structure that enables them to recall and generalize the information needed to solve any given problem within the specified domain.

CBI uses graphic organizers as visual and organizational templates to present knowledge forms and communicate relationships among attributes within and across concepts. Used in instructional delivery, graphic organizers provide students with a meaningful conceptual framework from which they can activate prior knowledge and create new schemata (Ausebel, 1968), leading to better and faster comprehension (Dunston, 1992). The presentation of knowledge forms systematically organizes information in a logical and strategic manner so students can gain better access to key principles and supporting arguments.

Methods

The rural school district we examined is located in the Pacific Northwest; the town has a population of 8,500. The nearest major population center is 20 miles from the school, and the community is still timber dependent, which contributes to a 10% higher unemployment rate than in the rest of the state. Per capita and median household income is also lower than in the state as a whole, with 14.4% of the population living in poverty (U.S. Census Bureau, 1999). The geographical setting and economic situation translate to the student population, of whom 51% are eligible for free and reduced lunch and breakfast programs, and 73% are eligible for district transportation to and from school (Oregon Department of Education, 2002a).

Setting

Of the school district's student population of 2,697 (578 at the participating middle school), 2.1% participated in English as a Second Language (ESL) programs, compared to the statewide ESL participation rate of 8.1% (Oregon Department of Education, 2002a). Even though the ESL participation rate (1.9%) at the middle school was slightly lower than the rates for the district and state, 33% of the students in our experimental group ($N = 34$), of which the student we studied was a member, were CLD students—a percentage significantly higher than the ESL participation levels in both the district and the state as a whole.

Participant

This case study of one seventh grader, to whom we will refer as “RM,” is part of a larger study that examined the effects of CBI on low-performing students in a rural school district in the Pacific Northwest. RM was a participant in a larger research study that compared the performance of two classrooms. His performance caught the teacher's and our attention because his scores were exceptional relative to his previous work on more traditional classroom and statewide assessment measures. We interviewed the content teacher and the ESL teacher to better understand his exemplary performance, which showed tremendous growth by the end of the intervention.

Quantitatively, RM scored in the 14th percentile on the previous year's statewide reading assessment, which is consistent with his pre-intervention low grades in English and social studies (mostly D's). His social studies teacher added context by providing the following description:

Teacher: [RM] is an ESL student. Very little English is spoken at home, and in fact in conferences he translated for his mother. He wasn't born in the U[nited] S[tates] but has been here since he was very little. His overall skills are low, but he isn't identified [for additional educational services beyond ESL]. He is, as I recall, a little lazy.

His ESL teacher gave a similar, more detailed description:

ESL Teacher: [RM] has been in the district since the first grade. He is bilingual, but only Spanish is spoken at home. [At the time of the study] he was in his last year of ESL, and there was significant pressure from home for success, even though his grades were so-so. There is variable cooperation between the content teachers and me, and since I am the only ESL teacher in the district, that may explain some of his poor grades. I didn't recommend any accommodations on the statewide writing assessment, but he probably needed it, given his scores. What was unique to him was that his father studied English with him after he completed his homework.

We describe RM's case because he is representative of other "at-risk" CLD students in the sample. Specifically, like all CLD students in this sample, he was eligible for free and reduced lunch, did not meet the state's requirements for reading and writing, earned low grades in English and social studies, and was identified as an English language learner.

Procedure

In this study, the unit of instruction covered four Meso-American civilizations—Olmec, Maya, Aztec, and Inca—using *Our World's Story* (Boehm, Hoone, McGowan, McKinney-Browning, & Miramontes, 1997) and the videotapes *The Second Voyage of the Mimi* (Sunburst Communications, 1994), *Maya: The Blood of Kings* (Time-Life Documentaries, n.d.), and *Inca: Secrets of the Ancestors* (Time-Life Documentaries, n.d.). Students also completed activities on hieroglyphic writing and composed a story identifying their *Nahual* [totem animal]. Both groups were provided with maze worksheets for each civilization as a note-taking strategy. At the end of the unit, students used their worksheets to create a map of an island after being given the scenario that they had just landed there and encountered people who were beginning to form a civilization and needed their advice. After creating their map, students wrote a description of how features on the map might impact

each other, using words from word banks, along with the maze worksheets. They included relationships among the words used to describe map features. A final multiple-choice/short-answer quiz was given at the end of the unit.

Experimental group

Students in the experimental group, including RM, were taught using CBI, in which content was introduced by explicitly teaching the concept “civilization” with four attributes: (a) religion-words that focus on people’s beliefs, (b) social-words that address how people lived together, (c) support-words relating to how people supported themselves, and (d) writing-words about how people communicated with written language. (See Figure 1 for an illustration of the graphic organizer for this unit.)

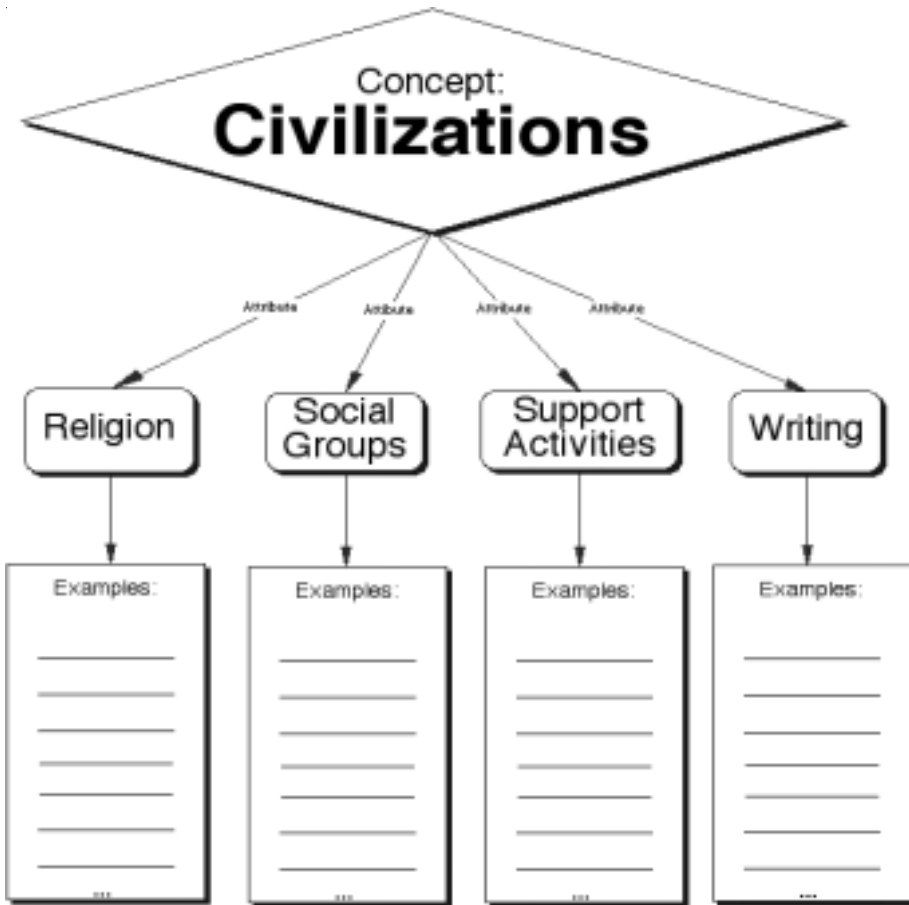


Figure 1. Graphic organizer depicting one concept and its attributes.

For each maze worksheet, students read a passage from the textbook *Our World's Story* (Boehm et al., 1997), then filled in the blanks of the corresponding maze worksheet by choosing from a list of words (word bank) categorized into the four attribute groups. (See Figure 2 for an example concerning the Mayas.) After completing and reviewing the maze worksheet, students completed a writing activity for each of the four civilizations.

MAYAS Words to Use in Completing the Sentences –

Accompany with Passage Missing Words

Religion Words	Social Words	Support Words	Writing Words
160 gods	600	Farming	365 days
pyramid	A. D. 900	innovations	calendars
rain god	500 B.C.	Rainforest	hieroglyphic
Religion	cities		number system
temples	empire		picture messages
	government		symbol
	population		wrote
	ruler		

- The Mayas had a simple _____ culture.
{Support}
The people lived along the edges of the Middle American _____.
{Support}
By about _____ Mayan civilization began to take shape.
{Social}
They built more than 100 _____.
{Social}
- Each city had its own _____ and its own government.
{Social}
The Mayas never united to form a central _____.
{Social}
From time to time, one powerful ruler or another rules many cities, building an _____.
{Social}
- The largest city of the Mayas was Tikal, with a _____ of more than 100,000.
{Social}
In the heart of Tikal, six large _____ surrounded the city center.
{Religion}
Each was made of huge blocks of limestone and shaped like a _____.
{Religion}
A jaguar with sharp curving claws is carved on one of the temples and honors the _____.
{Religion}

4. _____ was important in the lives of the Mayas.
{Religion}

The Mayas had as many as _____.
{Religion}

5. Mayan _____ were based on farming needs.
{Support}

The Mayas had two _____.
{Writing}

One calendar had _____ and was used to keep track of planting.
{Writing}

6. The Mayas also developed a _____ to keep track of stored crops.
{Writing}

The Mayans had a _____ for zero.
{Writing}

The Mayas created a system of _____ writing.
{Writing}

They carved and painted _____ on pillars, bowls, pots, and walls.
{Writing}

The Mayas also _____ in books.
{Writing}

7. Mayan civilization lasted over _____ years.
{Social}

After _____, the Mayan cities were left empty.
{Social}

Figure 2. Mayas reading maze worksheet.

Control group

Students in the control group were taught using a more traditional fact-based, model-lead-test approach, in which students were given an activity related to the coming lesson (a “bell ringer” to focus them), were led through a guided reading activity by the teacher, independently practiced their content understanding with a worksheet provided by the publisher, and were given a closure activity at the end of the lesson (e.g., a question-and-answer review). These students were taught identical content material using the same textbook pages, videos, activities, and assessment measures as the CBI group. The worksheets provided by the publisher were the primary practice instruments. However, the worksheets targeted primarily vocabulary words and isolated factual statements. Thus, for the experimental group, it was necessary to modify them so that they reflected explicit identification of concepts and attitudes. The worksheets were not modified for the control group. (See Figure 3 for an example of an unmodified worksheet used by the control group.)

Guided Reading for Chapter 10, Lesson 4B
Ancient Civilizations of the Americas (pages 323-324)

Name _____

Block _____

Date _____

Vocabulary: Machu Pichu
Cuzco
potatoes

1. In time the _____ covered more than _____ (about 4,000km) along the _____ mountains.
2. Inca legend says that the Incas built their capital city of _____ around _____.
3. By the 1500s _____ ruled a wide area, which they called the _____ of the _____.
4. The Incas believed that the many peoples of the empire would be less likely to _____ if everyone believed the same _____ and _____ the same _____.
5. They connected all _____ of the empire with the capital city of _____ through a system of wide _____.
6. This way of building can still be seen in the ruins of the Inca city of _____ in present day _____.
7. They began to build _____ - _____ cut into _____ and edged by _____.
8. Most of the food grown on these terraces went to _____.
9. In what ways did the Incas benefit from adapting to and changing their environment?

Figure 3. Transcription of a worksheet supplied by the textbook publisher.

Measurement of Outcomes

Map activity

The map activity was used primarily as an advance organizer (Ausebel, 1968) for the extended-response essay. The goal of this activity was to have students develop their ideas relative to the concept of civilization prior to writing the essay. The students were rated on the degree to which the map's land features were consistent with the attributes of civilization, which they were expected to explicitly list in the legend. Since there are state standards and benchmarks for social studies in this state, but no standardized test, this activity was deliberately aligned to the "Historical Skills" component of the state standards for the subsequent (eighth) grade, which requires students to "interpret and reconstruct chronological relationships" using timelines, narratives, and so forth (Oregon Department of Education, 2002b).

Extended-response essay

The major advantage of using an extended-response essay is its emphasis on a student's ability to integrate and apply his or her thinking in unique problem-solving scenarios. Also, an extended-response essay measures the complexity of student achievement more sensitively than objective test items (Linn & Gronlund, 1995). The essay was also specifically aligned to one of the state's benchmarks for world history for the subsequent (eighth) grade that requires students to "understand the major characteristics and historical influence of the early civilizations of . . . the Americas" (Oregon Department of Education, 2002b). Using a 1–5 rating scale, with 1 being the lowest and 5 the highest, the essay was evaluated by two master of education students on the explicit presence of attributes and their connectedness to each other. Twenty-four (76%) of the essay scores exactly matched, and eight (24%) were 1 point apart.

Results

Although no statistical differences were apparent in the maps created by students in the experimental versus the control group, statistically significant differences were found ($t[31] = -2.685, p = .012$) between the two groups in their writing. The similarity in the scoring of the maps was deemed inconsequential, as it served primarily as a pre-writing activity for the essay. As the data indicate, the experimental group outperformed the control group on the extended-response essay. Individually, RM's results are particularly interesting, because although RM scored only a 2 on the map, he scored a 5 on the essay. (See Figures 4a & 4b for the final assessment prompt, along with an image of RM's map.)

Final Activity

You have landed on an island and found out that people already live there. They have begun to form a civilization but have asked you for some advice. They heard that you have read about the early civilizations of the Americas – Olmecs, Mayas, Aztecs, and Incas. They think you know about **four important features of civilizations:**

Religion-people's beliefs

Social-how people lived together

Support-how people supported themselves

Writing-how people communicated with written language.

For this final activity on civilizations in the Americas, you need to do three things:

1. Make a drawing of the island and fill in the various land forms that are present. For example, draw where there might be rivers, forests, lakes, and open fields or hills and mountains. Where were there villages and cities?
2. For each of the features above (religion, social, support, and writing), create a picture symbol of it. Place the symbol somewhere on the map that reflects where it might be important.

Look back at your materials and worksheets that you have completed and any other sheets that were with them. **Describe how each feature above might have an impact on each other**, using the words from any word lists or curriculum materials. Use as many words from these materials as you can. Emphasize the relationship between the words used to complete the sentences and the feature they reflected.

Figure 4a. Final assessment prompt.

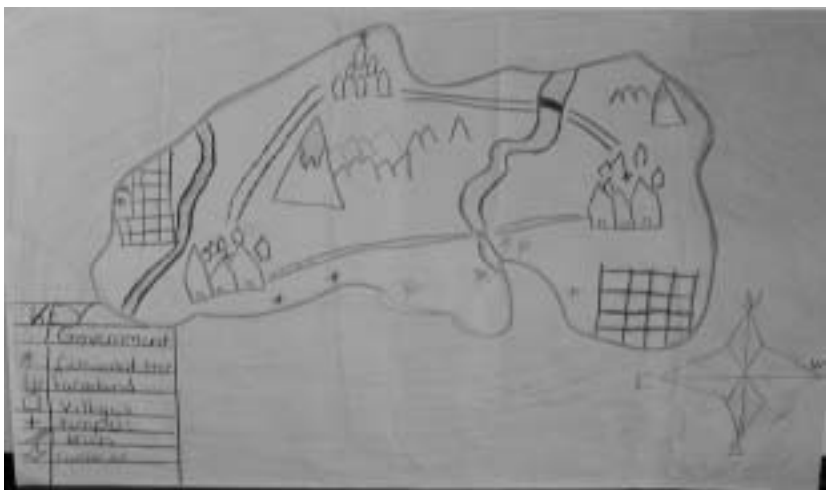


Figure 4b. Final assessment prompt: Example of RM's work.

Below is the transcript of RM's writing assessment, with errors reproduced verbatim:

I found my island in the Pacific Oceaon. People all ready lived there. They heard that I have read about the early civilization of amicas-omecs, Mayas, Aztecs, and Incas. They think I know about four important feature of civilization. Peoples belief was that the temples were religion. People lived together by building a small villige so they can support themselves. By the water the put a farmed land farmers go fishing a lot that's also a nother thing they support them selfs they had trails to go from one city to the other. People communicated with writing language that is colled hieyoglyphics that how they know how to get from one villige to the other by putting signs with hieyroglyphics.

RM's results on the writing assessment are consistent with the feelings he expressed about the material in his written responses to post-unit perception probes (errors have been edited):

Question: How easy was it for you to understand the information presented in the unit on the Early American Civilizations?

RM: Easy enough.

Question: How organized was the material presented on the Early American Civilizations?

RM: Pretty organized.

Question: What do the Olmec, Maya, Aztec, and Inca civilizations have in common? List three important words and ideas.

RM: Calendars, farmland, and religion.

Discussion

RM performed well above expectations. His score on the map exercise, while below the mean, was within the range of the first standard deviation. The content of his written work, on the other hand, was exemplary, placing him more than one standard deviation above the mean. According to the teacher, such superior work is not typical of RM's efforts. We believe that purposefully designed, delivered, and assessed instruction contributed to RM's success.

Though RM scored below average on the map activity, his conceptual understanding of civilization is solid, as evidenced in his writing sample. As the final activity was identical for both groups, RM's below-average use of specific examples from the text (which were required in creating the map) indicates that he was unable to access the text to master that knowledge. This is consistent with his previous achievement levels. His understanding of the

material at a deeper level after the text was organized conceptually, however, clearly shows that he understood the attributes of civilization differentially when given a structured opportunity to respond. Our findings extend the research base suggesting that CBI is beneficial for CLD students, in addition to students with disabilities and those with low basic skills.

Limitations

It would be inappropriate to suggest that the only plausible explanation for RM's performance was his involvement in this treatment effort. It would be equally extreme, given these limited results, to suggest that schools should rush to adopt CBI as a panacea for the needs of their CLD populations. This research, part of a much larger effort at validating CBI as an instruction method, provides evidence that CBI is a possible solution for schools to employ. The results presented here, however, when taken as an element of the larger picture of success for struggling students, represent an emerging line of research that should be followed up by a concentrated research effort targeting CLD populations with CBI in an attempt to validate its usefulness to this significant and growing population.

Implications

RM is a student who was falling through the cracks. He was perceived by his content teacher as "a little lazy," which was consistent with his grades but not with the description that his ESL teacher gave, or his ability to perform higher order problem-solving tasks. Typically, teachers use fact-based tests provided by the publisher, and this content teacher was no exception. Therefore, it is likely that the traditional measures of achievement are not sensitive enough to assess CLD students' understanding of content. Worse, traditional measures of achievement deflect attention from the real problem by portraying it as student based rather than curriculum or instruction based. Given that curriculum adoption and professional development are costly endeavors, and rural schools often are financially strapped, CBI is an approach that can ameliorate these issues by addressing the needs of all students without specialized curriculum or expertise. Furthermore, many rural schools face budgetary constraints and typically do not have the funds relative to enrollment to justify language specialists at every school. For example, in RM's school district, the ESL teacher travels to different sites for instruction, which necessitates collaboration between the ESL and content teachers. Collecting data in an assessment system that is sensitive to CLD students should increase the accuracy of decisions in instructional interventions.

As rural schools struggle under political initiatives mandating the use of effective educational research, schools are under pressure to modify and extend services to meet the needs of the broadest possible constituency, despite limited and potentially reduced resources. These realities, combined

with the potential of CBI, may provide the catalyst for meaningful change in CLD students' achievement and the services they receive.

Conclusion

As schools attempt to meet the goals outlined by NCLB, under which adequate yearly progress on statewide tests of all students is the marker of progress, it is clear that high-quality curriculum and instruction are necessary if students are to improve their performance on these measures. CBI is a tool that can easily align current texts and instruction to the state standards without the need for adoption of new curricula or extensive professional development. Furthermore, the potential consequences of not making adequate yearly progress puts rural schools in an untenable position. First, the possibility that the federal government could withhold Title I funds would further strap these schools financially because they have a large population of students who are eligible for these funds. Reducing already shallow budgets creates a situation in which students are even less likely to improve their scores. A second potential consequence involves parental choice. Under NCLB, a parent can enroll his or her child in another school if the child's current school is failing. This is not an option for parents of children in the school in this study because it is the only middle school in the district.

Current funding levels, combined with NCLB, necessitate that all schools find affordable and effective means of accommodating all students. For rural schools in particular, where CLD student populations have greater academic needs, CBI shows great promise as a potential tool to mitigate professional, economic, and legislated challenges.

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